The rest of this report is item (6) vol. 2 WBC 6/14/95

Site Evaluation: YOLLA BOLLA RESEARCH NATURAL AREA 12/28/75

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I. INTRODUCTION

At the request of Dr. W. B. Critchfield, Pacific Southwest Forest and Range Experiment Station, I visited and inventoried the proposed Yolla Bolla Research Natural Area on the Shasta-Trinity National Forest, Yolla Bolla District. Preliminary reconnaissance was made of the site on 14-15 August 1975, and detailed vegetation sampling was made on 14-17 September 1975. This report details the results of this inventory. In addition to this report, a scientific manuscript I have written for publication on the area (submitted to Northwest Science, December 1975) is attached and referred to here.

II. LOCATION

The study area is located on the Shasta-Trinity National Forest, Yolla Bolla District, in T28N, R12W, portions of sections 14,15,16 (see Fig. 1 in ms., Map 1 of this report).

III. DESCRIPTION OF THE AREA

A. Forest Cover

The attached manuscript provides a description of the vegetation of the candidate area (see pages 9 and 10). Twenty-eight stand surveys (termed relevés in the ms.) were sampled in the study area. These samples

were obtained using stand survey methods used by many plant ecologists. The recent text by Mueller-Dombois and Ellenberg has an excellent review of the theory behind the sampling methods employed (reference in ms.). The locations of these stand surveys are given on Map 1. Each stand survey was made by identifying all species present in a homogeneous patch of vegetation and estimating cover. The size of the stand surveys was controlled by determination of the slope of a curve which plots number of species in the stand against stand area (= minimal area criterion referred to in ms.). Thus, the stands sampled had variable area depending on the species richness of the vegetation.

In addition to the stand surveys sampled, 18 circular plots were established at selected stands for more detailed analysis of forest composition and structure. The size of these plots varied depending on the minimal area needed to adequately represent the location being sampled. All trees within the plots greater than 1.5 meters tall (approx. breast height) were measured with a diameter tape. Saplings (less than 1.5 m tall to .4 meters tall) and seedlings (less than .4 meters tall) were counted but were not included in tree density figures for the plots. From this data, Basal Area (square meters of bole wood/hectare), relative dominance (% of total basal area), density (number of trees greater than 1.5 m tall/hectare), relative density (% of total density) and importance value (relative dominance plus relative density) were calculated for each plot, and these data are reported in Table A of this report, and summarized in Table 4 of the ms.

The forest cover of the area approximates the PACIFIC DOUGLAS-FIR TYPE (Society of American Foresters, #229; see Forest Community Types of North

America, 1954). Pseudotsuga menziesii is the dominant tree, making up 70% of the basal area, and 60% of all trees in the area (Photo 1). Abies concolor is a rather rare component of the mature tree stratum, but is found in abundance in younger age-classes (seedlings and saplings). A. concolor comprises 8% of the basal area and 17% of all trees on the site. Several other conifers are important, with Pinus lambertiana being the most abundant. Pinus ponderosa and Calocedrus decurrens are mostly confined to xeric, open areas in the study area (Photo 2).

The forest cover of the area is rather open, canopy coverage is about 50%. Frequent fires, as evidenced by cat-faces on most large trees in the area, undoubtedly maintained low stand density in the past. The lack of recent (within historical record?) fires in the area has resulted in a shift in seedling and sapling mortality patterns, allowing the establishment of thick, even-aged stands of young Pseudotsuga and Abies below the more open canopy. This is a general occurrence in most all mixed coniferous forests of California, and should not detract from the quality of the area as a research tool.

B. Soils and Geology

Soils and Regional Geology are described on page 3 of the ms. Two dominant soil series occur near the study area, the Hugo soils and the Josephine soils. Profiles were not dug in the study area, but where I was able to examine natural erosion areas, I noted considerable rock-gravel in the profile, indicating a more Hugo-like soil.

C. Regional Climate

Refer to pages 4 and 5 in the ms. for a description of regional climate.

D. Species List

A list of the plants encountered by the investigator in the area is provided in Table B. None of the species seen are considered endangered (California Native Plant Society Special Publication No. 1: Powell, W. R., 1974. Inventory of Rare and Endangered Vascular Plants of California). The season in which this survey was conducted was not prime for the collection or identification of the flora. All species I encountered in the stand surveys were identified, and I noted all others I recognized while in the vicinity of the area. However, the species list made is probably quite incomplete.

E. Other site characteristics

The vegetation of the site is quite uniform, so that mapping of vegetation units is not necessary. Some general vegetation trends can be mentioned here, however. Exposed topographic positions have less dense forest cover in general, and Pinus ponderosa is limited to these sites (see Photo 2). Pinus lambertiana increases in abundance with increasing elevation, and is common above 4000 feet (mostly above the limits of the study area). The site is surrounded to the north and east by islands of ultrabasic rock which supports an unusual flora and stands of Pinus jeffreyi, but none was seen in the vicinity of the area.

Estimates of the annual growth increment of selected trees on several plots was made by removing an increment-core and measuring ring width (Table C). The relative rates of growth of each taxon should be considered when the data in Table C are considered. Site-index for P. menziesii was not determined because of time limitations, but I feel that it would prove to be relatively high. The total standing biomass and primary productivity of the site is probably quite high owing to the climate of the area.

The riverbed of the South Fork of the Trinity River in the site is vegetated by a riparian association (see pages 10-11 of the ms.; Photo 1).

A Spotted Owl was seen by the investigator at mid-day in the area. This species is considered threatened by the U.S. Fish and Wildlife Service (Photo 3).

IV. SITE INTEGRITY AND ACCESSIBILITY

Evidence of human visitation to the site is minimal. Litter, fire pits, etc., are not in evidence, even along the river. A cabin at the junction of Red Mountain Creek (called St. Jaques on the Trinity National Forest map) is occupied year round. The occupant maintains a narrow (6 feet wide) trail into the canyon from the switchbacks on the dirt road to the Murphy place (section 10 on map). This trail is not on any U.S.F.S. map nor is it on the U.S.G.S. Dubakella quadrangle (15'). This trail is traveled by motor-bike and with a small tractor by the residents of cabins in the canyon. They use the trail to ferry supplies. The occupant of St. Jaques states that the few visitors to the vicinity are fishermen and hikers.

Access to the site for research purposes is minimal. The unofficial trail into the canyon from the Murphy road would serve as access. No bridges cross the South Fork of the Trinity River near here. Fording the river would be impossible during times of high run-off (snow-melt season). I crossed the river easily in both August and September. Access to the site from Happy Camp Spring via trail 2W38 is difficult due to a descent of nearly 2500 feet. The trail from the Murphy road descends 500 feet in an easy grade.

No evidence of gold dredging operations, as mentioned in the draft Establishment Report, was seen in the area.

V. SITE NAME

The proposed name for the area (Yolla Bolla Research Natural Area) is somewhat misleading. The name implies a connection with or location in the Yolla Bolly Mountains some 15 miles to the south. Clearly, since the area is not located in the Yolla Bolly mountains, an alternate name for the area is required. South Fork Mountain Research Natural Area would be most appropriate, since South Fork Mountain is the main structural feature of this region, and can be found on most large scale maps (cf. U.S.G.S. 1/250,000; International Map of the World, 1/1,000,000). It is also unfortunate that two distinct spellings of Bolly or Bolla are in use.

VI. SITE BOUNDARIES

Site integrity should be the main criterion considered when boundaries for a natural area are selected. Ideally, a natural area should be an integrated landscape unit such as a whole watershed in order to minimize outside influences on the area. The boundaries of the site as shown on the draft Establishment Report do not meet this requirement of integrity: logging or related activities on the margins of the area as proposed could have serious impact on the integrity of the natural area. Therefore, slight adjustment of the site boundaries is in order. The south boundary as originally proposed leaves the area vulnerable to disturbance, as it follows the bed of the unnamed west branch of Happy Camp Creek. This boundary should be moved south to the ridgeline, as shown on Map 1. The result of this adjustment would be the inclusion of the entire watershed of the unnamed west branch of Happy Camp Creek within the natural area.

(Please refer to the original map in the Establishment Report in conjunction with Map 1). If necessary to limit the size of the natural area, the areas marked "B" and "C" on Map 1 are expendable and could be excluded from the natural area to compensate for total area protected, keeping the size of the natural area similar to the acreage proposed.

ATTACHMENTS

Map 1. Map of area.

Table A. Stand survey plots.

Table B. Species list.

Table C. Growth data.

Manuscript "Composition of an old-growth Douglas-fir forest in northwestern California"

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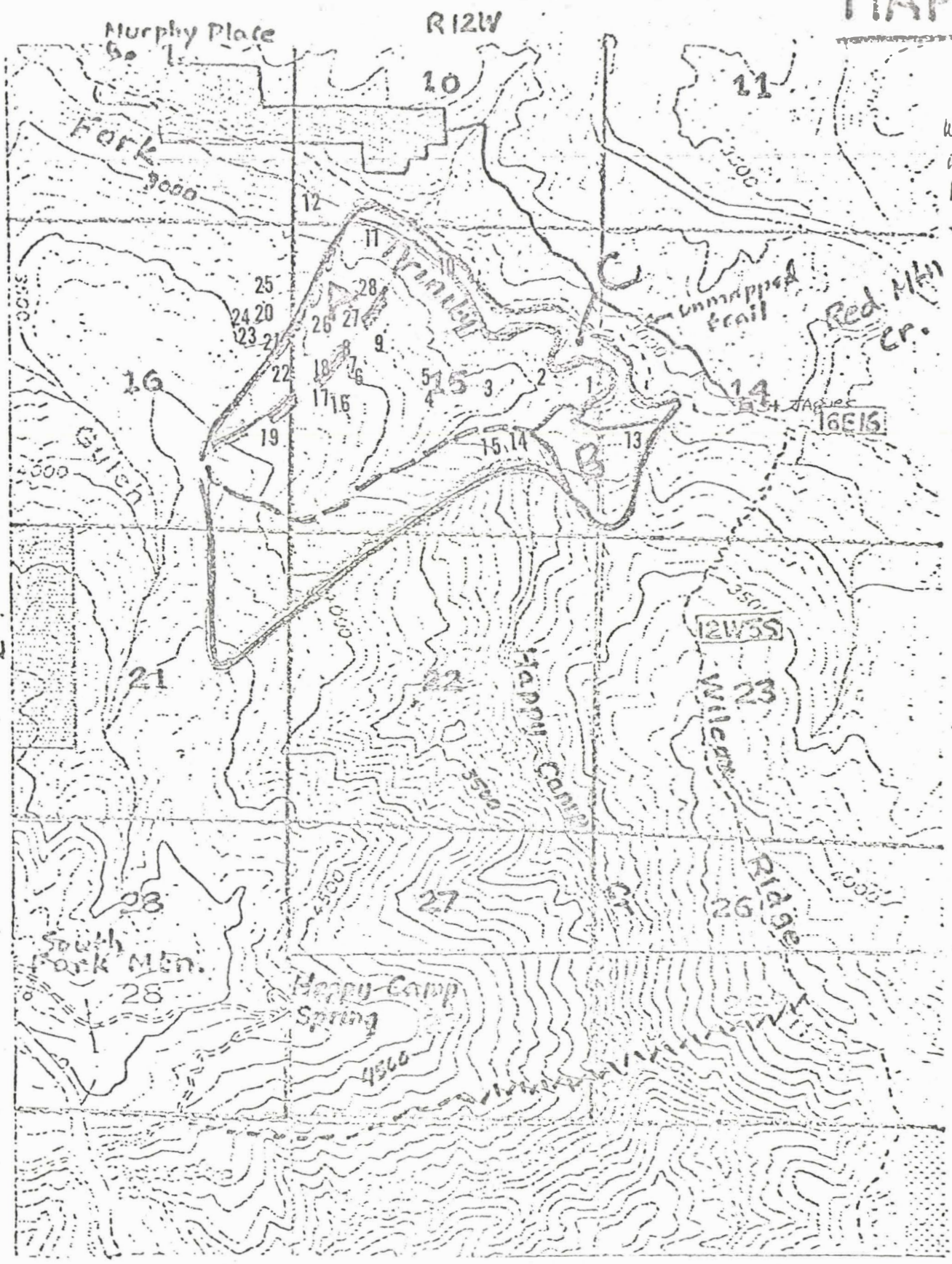
MAP 1



Plot #'s

1. 302
2. 274
3. 275
4. 276
5. 277
6. 278
7. 279
8. 280
9. 281
10. 303
11. 282
12. 283
13. 284
14. 285
15. 286
16. 287
17. 288
18. 289
19. 290
20. 292
21. 293
22. 294
23. 295
24.
25.

YOLLA BOLLA RESEARCH NATURAL AREA

see Dubakella Mtn Quadrangle (15')

= = = Existing poor road

South Fork Unit Plan Bndry

Existing trail

297 301

TABLE A. Stand Survey Plots.

BASAL AREA PROGRAM
STAND No.= 274
PLOT RADIUS= 30.000
PLOT AREA = 2827.43meters

TAXON	BA[1] (m^2/ha)	REL. DOM.[2]	DENS.[3] (#/ha)	REL. DENS.[4]	IMP. VAL.[5]
Pseudotsuga menziesii	23.995	93.25	134.39	70.3	163.6
Castanopsis chrysophylla	1.083	4.21	31.83	16.6	20.8
Quercus chrysolepis	.216	.84	10.61	5.5	6.3
Quercus kelloggii	.434	1.68	14.14	7.4	9.0
TOTALS	25.730		190.98		

BASAL AREA PROGRAM
STAND No.= 276
PLOT RADIUS= 15.000
PLOT AREA = 706.85meters

TAXON	BA (m^2/ha)	REL. DOM.	DENS. (#/ha)	REL. DENS.	IMP. VAL.
Pseudotsuga menziesii	8.157	11.51	1485.44	86.0	97.5
Pinus ponderosa	37.228	52.56	56.58	3.2	55.8
Pinus lambertiana	16.009	22.60	28.29	1.6	24.2
Quercus kelloggii	9.434	13.31	155.61	9.0	22.3
TOTALS	70.831		1725.94		

BASAL AREA PROGRAM
STAND No.= 277
PLOT RADIUS= 10.000
PLOT AREA = 314.15meters

TAXON	BA (m^2/ha)	REL. DOM.	DENS. (#/ha)	REL. DENS.	IMP. VAL.
Pseudotsuga menziesii	65.324	92.31	954.92	88.2	180.5
Quercus kelloggii	3.152	4.45	63.66	5.8	10.3
Castanopsis chrysophylla	.722	1.02	31.83	2.9	3.9
Arbutus menziesii	1.562	2.20	31.83	2.9	5.1
TOTALS	70.762		1082.25		

Table A continued.

BASAL AREA PROGRAM
STAND No.= 278
PLOT RADIUS= 10.000
PLOT AREA = 314.15meters

TAXON	BA (m^2/ha)	REL. DOM.	DENS. (#/ha)	REL. DENS.	IMP. VAL.
Pseudotsuga menziesii	70.297	67.20	127.32	30.7	97.9
Abies concolor	32.922	31.47	95.49	23.0	54.5
Cornus nuttallii	1.349	1.29	127.32	30.7	32.0
Calocedrus decurrens	.024	.02	63.66	15.3	15.4
TOTALS	104.594		413.80		

BASAL AREA PROGRAM
STAND No.= 280
PLOT RADIUS= 15.000
PLOT AREA = 706.85meters

TAXON	BA (m^2/ha)	REL. DOM.	DENS. (#/ha)	REL. DENS.	IMP. VAL.
Pseudotsuga menziesii	26.972	84.14	84.88	33.3	117.4
Castanopsis chrysophylla	4.249	13.25	28.29	11.1	24.3
Abies concolor	.119	.37	84.88	33.3	33.7
Arbutus menziesii	.694	2.16	14.14	5.5	7.7
Pinus lambertiana	.019	.05	42.44	16.6	16.7
TOTALS	32.055		254.64		

BASAL AREA PROGRAM
STAND No.= 282
PLOT RADIUS= 20.000
PLOT AREA = 1256.63meters

TAXON	BA (m^2/ha)	REL. DOM.	DENS. (#/ha)	REL. DENS.	IMP. VAL.
Pseudotsuga menziesii	28.644	86.60	103.45	46.4	133.0
Abies concolor	2.776	8.39	23.87	10.7	19.1
Arbutus menziesii	.181	.54	15.91	7.1	7.6
Castanopsis chrysophylla	.929	2.81	55.70	25.0	27.8
Quercus chrysolepis	.525	1.58	15.91	7.1	8.7
Acer macrophyllum	.015	.04	7.95	3.5	3.6
TOTALS	33.073		222.81		

Table A continued

BASAL AREA PROGRAM
STAND No.= 299
PLOT RADIUS= 15.000
PLOT AREA = 706.85meters

TAXON	BA (m^2/ha)	REL. DOM.	DENS. (#/ha)	REL. DENS.	IMP. VAL.
Pseudotsuga menziesii	14.072	57.14	240.50	42.5	99.6
Castanopsis chrysophylla	2.932	11.90	70.73	12.5	24.4
Pinus lambertiana	3.361	13.64	14.14	2.5	16.1
Arbutus menziesii	3.361	13.64	14.14	2.5	16.1
Abies concolor	.899	3.65	226.35	40.0	43.6
TOTALS	24.626		565.88		

BASAL AREA PROGRAM
STAND No.= 300
PLOT RADIUS= 20.000
PLOT AREA = 1256.63meters

TAXON	BA (m^2/ha)	REL. DOM.	DENS. (#/ha)	REL. DENS.	IMP. VAL.
Pseudotsuga menziesii	14.268	85.14	127.32	72.7	157.8
Pinus lambertiana	2.250	13.42	7.95	4.5	17.9
Castanopsis chrysophylla	.156	.93	15.91	9.0	10.0
Arbutus menziesii	.021	.12	15.91	9.0	9.2
Cornus nuttallii	.062	.37	7.95	4.5	4.9
TOTALS	16.758		175.07		

BASAL AREA PROGRAM
STAND No.= 285
PLOT RADIUS= 20.000
PLOT AREA = 1256.63meters

TAXON	BA (m^2/ha)	REL. DOM.	DENS. (#/ha)	REL. DENS.	IMP. VAL.
Pseudotsuga menziesii	41.421	76.15	79.57	13.8	90.0
Pinus lambertiana	9.005	16.55	15.91	2.7	19.3
Abies concolor	3.199	5.88	469.50	81.9	87.8
Arbutus menziesii	.765	1.40	7.95	1.3	2.7
TOTALS	54.393		572.95		

Table A continued

BASAL AREA PROGRAM
STAND No.= 294
PLOT RADIUS= 20.000
PLOT AREA = 1256.63meters

TAXON	BA (m^2/ha)	REL. DOM.	DENS. (#/ha)	REL. DENS.	IMP. VAL.
Pseudotsuga menziesii	14.951	95.79	71.61	45.0	140.7
Abies concolor	.233	1.49	23.87	15.0	16.4
Calocedrus decurrens	.398	2.55	23.87	15.0	17.5
Pinus lambertiana	.024	.16	39.78	25.0	25.1
TOTALS	15.608		159.15		

BASAL AREA PROGRAM
STAND No.= 295
PLOT RADIUS= 20.000
PLOT AREA = 1256.63meters

TAXON	BA (m^2/ha)	REL. DOM.	DENS. (#/ha)	REL. DENS.	IMP. VAL.
Pseudotsuga menziesii	12.827	88.27	111.40	82.3	170.6
Calocedrus decurrens	1.140	7.84	15.91	11.7	19.6
Pinus lambertiana	.562	3.87	7.95	5.8	9.7
TOTALS	14.530		135.28		

BASAL AREA PROGRAM
STAND No.= 298
PLOT RADIUS= 20.000
PLOT AREA = 1256.63meters

TAXON	BA (m^2/ha)	REL. DOM.	DENS. (#/ha)	REL. DENS.	IMP. VAL.
Pseudotsuga menziesii	24.193	86.15	565.00	78.8	165.0
Arbutus menziesii	3.735	13.30	127.32	17.7	31.0
Abies concolor	.140	.50	7.95	1.1	1.6
Quercus kelloggii	.009	.03	7.95	1.1	1.1
Quercus chrysolepis	.002	.00	7.95	1.1	1.1
TOTALS	28.082		716.19		

Table A continued

BASAL AREA PROGRAM
STAND No.= 284
PLOT RADIUS= 15.000
PLOT AREA = 706.85meters

TAXON	BA (m^2/ha)	REL. DOM.	DENS. (#/ha)	REL. DENS.	IMP. VAL.
Pseudotsuga menziesii	74.459	93.62	240.50	48.5	142.1
Abies concolor	.203	.25	56.58	11.4	11.6
Arbutus menziesii	3.097	3.89	70.73	14.2	18.1
Cornus nuttallii	.393	.49	42.44	8.5	9.0
Quercus kelloggii	.401	.50	14.14	2.8	3.3
Castanopsis chrysophylla	.971	1.22	56.58	11.4	12.6
Pinus lambertiana	.001	.00	14.14	2.8	2.8
TOTALS	79.527		495.14		

BASAL AREA PROGRAM
STAND No.= 286
PLOT RADIUS= 20.000
PLOT AREA = 1256.63meters

TAXON	BA (m^2/ha)	REL. DOM.	DENS. (#/ha)	REL. DENS.	IMP. VAL.
Pseudotsuga menziesii	13.599	55.69	143.23	31.0	86.7
Castanopsis chrysophylla	4.444	18.20	71.61	15.5	33.7
Quercus kelloggii	3.108	12.73	63.66	13.7	26.5
Arbutus menziesii	3.090	12.65	55.70	12.0	24.7
Abies concolor	.160	.65	119.36	25.8	26.5
Quercus chrysolepis	.015	.06	7.95	1.7	1.7
TOTALS	24.419		461.54		

BASAL AREA PROGRAM
STAND No.= 287
PLOT RADIUS= 30.000
PLOT AREA = 2827.43meters

TAXON	BA (m^2/ha)	REL. DOM.	DENS. (#/ha)	REL. DENS.	IMP. VAL.
Pinus ponderosa	7.814	42.60	42.44	6.3	48.9
Pseudotsuga menziesii	7.360	40.13	410.26	61.0	101.1
Abies concolor	.153	.83	173.30	25.7	26.6
Pinus lambertiana	.249	1.36	3.53	.5	1.8
Calocedrus decurrens	1.887	10.28	10.61	1.5	11.8
Arbutus menziesii	.876	4.77	31.83	4.7	9.5
TOTALS	18.341		671.98		

Table A concluded.

BASAL AREA PROGRAM
STAND No.= 289
PLOT RADIUS= 20.000
PLOT AREA = 1256.63meters

TAXON	BA (m^2/ha)	REL. DOM.	DENS. (#/ha)	REL. DENS.	IMP. VAL.
Pseudotsuga menziesii	15.890	60.73	15.91	5.7	66.4
Castanopsis chrysophylla	6.222	23.78	103.45	37.1	60.9
Arbutus menziesii	1.622	6.20	23.87	8.5	14.7
Abies concolor	2.321	8.87	119.36	42.8	51.7
Pinus lambertiana	.108	.41	15.91	5.7	6.1
TOTALS	26.165		278.52		

BASAL AREA PROGRAM
STAND No.= 290
PLOT RADIUS= 20.000
PLOT AREA = 1256.63meters

TAXON	BA (m^2/ha)	REL. DOM.	DENS. (#/ha)	REL. DENS.	IMP. VAL.
Pseudotsuga menziesii	16.260	41.44	39.78	18.5	59.9
Arbutus menziesii	1.622	4.13	23.87	11.1	15.2
Castanopsis chrysophylla	2.170	5.53	95.49	44.4	49.9
Pinus lambertiana	19.140	48.78	7.95	3.7	52.4
Abies concolor	.043	.11	47.74	22.2	22.3
TOTALS	39.238		214.85		

BASAL AREA PROGRAM
STAND No.= 293
PLOT RADIUS= 20.000
PLOT AREA = 1256.63meters

TAXON	BA (m^2/ha)	REL. DOM.	DENS. (#/ha)	REL. DENS.	IMP. VAL.
Pseudotsuga menziesii	6.168	63.66	151.19	79.1	142.8
Pinus lambertiana	1.624	16.77	15.91	8.3	25.1
Calocedrus decurrens	1.893	19.53	15.91	8.3	27.8
Pinus ponderosa	.002	.02	7.95	4.1	4.1
TOTALS	9.689		190.98		

1 Basal Area
2 Relative Dominance
3 Density
4 Relative Density
5 Importance Value

TABLE B. Plant species observed in or near the Yolla Bolla Research Natural Area between 15 August 1975 and 17 September 1975.

[Nomenclature follows Munz: A California Flora.]

Aceraceae
- Acer macrophyllum

Anacardiaceae
- Rhus diversiloba
- R. trilobata

Apocynaceae
- Apocynum pumilum

Araliaceae
- Aralia californica

Aspidiaceae
- Dryopteris dilatata
- Polystichum munitum

Berberidaceae
- Berberis nervosa
- Vancouveria planipetala

Betulaceae
- Alnus oregona
- Corylus cornuta var. californica

Blechnaceae
- Woodwardia fimbriata

Campanulaceae
- Campanula prenanthoides

Caprifoliaceae
- Linnaea borealis
- Symphoricarpos albus
- S. mollis

Caryophyllaceae
- Silene californica

Compositae
- Adenocaulon bicolor
- Arnica discoidea
- Balsamorhiza sagittata
- Erigeron angustifolius var. inornatus
- Hieracium albiflorum
- Microseris nutans
- Petasites palmatus

TABLE B. (Cont.)

Cornaceae
- Cornus Nuttallii

Crassulaceae
- Sedum Purdyi

Cruciferae
- Arabis suffrutescens

Cupressaceae
- Calocedrus decurrens

Cyperaceae
- Carex amplifolia
- C. leptopoda
- C. senta

Equisetaceae
- Equisetum arvense
- E. Telmateia

Ericaceae
- Arbutus Menziesii
- Arctostaphylos patula
- A. glauca
- Chimaphila umbellata var. occidentalis
- Vaccinium parvifolium

Fagaceae
- Chrysolepis chrysophylla (= Castanopsis chrysophylla)
- Quercus chrysolepis
- Q. Kelloggii

Fumariaceae
- Dicentra formosa

Gramineae
- Bromus marginatus
- Calamagrostis rubescens
- Elymus glaucus
- Torreyochloa pauciflora

Hydrophyllaceae
- Draperia systyla

TABLE B. (Cont.)

Iridaceae
- Iris tenuissima

Juncaceae
- Juncus effusus
- Luzula comosa

Labiatae
- Prunella vulgaris
- Stachys rigida

Leguminaceae
- Lathyrus polyphyllus
- L. Torreyi
- Lotus grandiflorus
- L. subpinnatus

Liliaceae
- Disporum Hookeri
- Lilium parvum
- Smilacina stellata
- Xerophyllum tenax

Oleaceae
- Fraxinus latifolia

Orchidaceae
- Goodyera oblongifolia
- Habenaria unalascensis

Pinaceae
- Abies concolor
- Pinus lambertiana
- P. ponderosa
- Pseudotsuga menziesii

Polygonaceae
- Eriogonum nudum ssp. latifolium

Primulaceae
- Trientalis latifolia

Pteridaceae
- Adiantum pedatum
- Cheilanthes gracillima
- Onychium densum
- Pteridium aquilinum var. pubescens

Pyrolaceae
- Pyrola picta

TABLE B. (Cont.)

Ranunculaceae
- Aquilegia truncata var. formosa

Rhamnaceae
- Ceanothus integerrimus
- C. prostratus
- Rhamnus californica
- R. Purshiana

Rosaceae
- Amelanchier pallida
- Rosa psilocarpa
- Rubus leucodermis
- R. parviflorus

Rubiaceae
- Galium trifolium

Salicaceae
- Salix lasiolepis

Saxifragaceae
- Peltiphyllum peltatum
- Philadelphus Lewisii ssp. californicus
- Ribes nevadense
- Tellima grandiflora
- Whipplea modesta

Taxaceae
- Taxus brevifolia

Umbelliferae
- Osmorhiza chilensis

Urticaceae
- Urtica holosericea

Violaceae
- Viola glabella

Vitaceae
- Vitis californica

TABLE C. Annual Growth Increment Data--outer 20 seasons growth

Yolla Bolla Research Natural Area, Trinity County, California.

Plot	Taxon	dbh (cm)	Ann. inc. (mm)	SD.	Coef. var. (%)
274	Castanopsis	23	2.28	1.02	44.7
274	Q. chrysolepis	20	.71	.12	16.9
274	Q. Kelloggii	25	.97	.27	27.8
274	Pseudotsuga	35	1.90	.29	15.2
274	Pseudotsuga	185	2.04	.31	15.1
277	Pseudotsuga	40	2.06	.57	27.6
277	Pseudotsuga	30	1.08	.25	23.1
277	Arbutus	25	2.66 a	.87	32.7
280	Pseudotsuga	70	.78	.20	25.6
280	Pseudotsuga	45	.57	.19	33.3
282	Pseudotsuga	90	1.40	.39	27.8
282	Castanopsis	20	1.57	.43	27.3
284	Pseudotsuga	35	1.20	.27	22.5
284	Arbutus	17	2.43 b	.45	18.5
284	Castanopsis	22	1.26	.27	21.4
285	Pseudotsuga	105	.28	.05	17.8
285	Pseudotsuga	65	1.23	.27	21.9
286	Pseudotsuga	35	1.63	.28	17.2
286	Pseudotsuga	25	.30	.06	20.0
286	Castanopsis	45	1.28 a	.33	25.7
287	Pseudotsuga	100	.77	.30	39.9
287	Pseudotsuga	50	.32	.11	34.3
289	Pseudotsuga	105	.75	.13	17.3
295	Pseudotsuga	115	.41	.22	53.6
295	Pseudotsuga	35	.79	.19	24.0

a = based on six-outer years only
b = based on eight-outer years only

Photo 1: South Fork of the Trinity River in the Study area. The *Carex senta/Peltiphyllum peltatum* associated is confined to the river-bed below the level of the mean annual high water mark. Large shrubs below the level of highest floods are *Alnus oregana* and *Rhamnus purshiana*. *Pseudotsuga menziesii* dominates the forest above the highest level of flooding. 15 August 1975.

Photo 2: Ridgecrest openings in the Douglas-fir forest of the site are dominated by ponderosa pine, seen here with normal reproduction. These openings are probably fire-maintained on sites with shallow soils, and could be expected to be invaded by white fir and Douglas-fir if fire frequency is reduced.

Photo 3: A Spotted Owl (*Strix occidentalis*) seen in a dense stand of white fir and a few Douglas-fir saplings. This density of reproduction is typical of many of the stands sampled (refer to manuscript for density values). Self-shading is evident, and many of the individuals in this photo have died from light competition and are in various stages of repose.